

Attachment 6

Guidance for the Identification of Targets and Their Ignition and Damage Criteria

The identification of nearest ignition and damage targets will most often involve the identification of cables as both ignition and damage targets. Often the same cable will represent both targets. For cables, the ignition and damage criteria will be assumed to be the same. Heat flux and temperature criteria for damage and/or ignition are identified below:

Table A6.1 - Screening Criteria for the Assessment of the Ignition and Damage Potential of Electrical Cables		
Cable Type	Radiant Heating Criteria	Temperature Criteria
Thermoplastic	6 kW/m ² (0.5 BTU/ft ² s)	205 °C (400 °F)
Thermoset	11 kW/m ² (1.0 BTU/ft ² s)	330 °C (625 °F)

Additional rules for application in the target identification task are:

Cables in conduit will be considered potential damage targets, but not ignition targets. Cables in conduit will not contribute to fire growth and spread. The conduit will be given no credit for delaying the onset of thermal damage.

Cables coated by a fire-retardant coating will be considered as both thermal damage and fire spread targets. For the purposes of the Phase 2 analysis, no credit will be given to the coating for delaying or preventing the onset of damage and/or ignition.

In identifying damage targets, do not include components directly within or associated with the fire ignition source itself. The fire ignition source will inherently be assumed to be damaged given any fire involving itself as the source so further evaluation of the components as damage targets is unnecessary.

Example: for an electrical panel fire, all equipment and components within the panel will be assumed to fail. Per the counting guidance, a panel will be defined as a distinct vertical section in this context.

Example: Given a self-ignited cable fire, all cables in the initiating raceway will be assumed to fail immediately on fire ignition (time zero).

If a scenario should arise involving solid state control components as a thermal damage target, the failure criteria to be applied in screening are 0.25 BTU/ft²s and 200 °F. The criteria for ignition of the components will assume properties similar to thermoplastic cables (0.5 BTU/ft²s and 400 °F).

Pipes and water tanks constructed of ferrous metal will be considered invulnerable to fire damage.

For major components such as motors, valves, etc., the fire vulnerability will be assumed to be limited by the vulnerability of the required power, control, and or instrument cables supporting the component.

Passive components (e.g., flow check valves) will be considered invulnerable to fire.

Mixed Cable Insulation/Jacket Type Configurations

There are cables that are formulated with a thermoset insulation and a thermoplastic jacket, and potentially, *vice-versa*. Armored cables may have a bare metal armor exposed, or may have either a thermoset or thermoplastic covering over the metallic armor. For such cases, some special consideration is needed.

In the SDP process, the analysis does not distinguish between ignition and damage behaviors. Ignition of a cable is taken as an indication of imminent failure. In the assessment of whether to treat a cable as a thermoset or thermoplastic, the weakest link will dominate. For example, a cable with a thermoset insulation and a thermoplastic jacket will be treated using the failure criteria of a thermoplastic cable to reflect the reduced resistance to ignition of the jacket material. A cable with a thermoplastic insulation and a thermoset jacket will also be treated as a thermoplastic due to the likelihood of melting of the insulation material.

The following table provides a decision matrix for the selection of which failure/ignition property set to apply to a given cable.

Table A6.2 - Cable Properties Selection Decision Matrix		
Cable Construction / Configuration		Ignition/Damage Parameter Set to be Used
Insulation Type	Jacket/Covering Type	
TS	TS	TS
TS	TP	TP
TP	TS	TP
TP	TP	TP
Armored - TS	TS, or No Cover	TS
Armored - TS	TP Cover	TP
Armored - TP	TS, TP, or No Cover	TP

TS = Thermoset

TP = Thermoplastic